

Integrating AI Literacy into Adult Education Programmes for Sustainable Community Development and Workforce Preparedness in Obio/Akpo Local Government Area of Rivers State

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Abstract

The study examined integrating AI literacy into adult education programmes for sustainable community development and workforce preparedness in Obio/Akpo Local Government Area of Rivers State. Three (3) purposes, research questions and hypotheses respectively guided the study. The study adopted a descriptive survey research design. The population of the study comprised of 485 respondents, 72 instructors and 413 beneficiaries in the adult training center in Obio/Akpor Local Government Area of Rivers State. From the population, a sample of 194 respondents, 28 of which were instructors and 166 of which were beneficiaries constituted the sample size, representing 40% of the entire population. The sample size was obtained through simple random sampling technique. The instrument for data collection was a questionnaire tagged “Integrating AI Literacy into Adult Education Programmes for Sustainable Community Development and Workforce Preparedness Questionnaire (IAILADPSCDWQ)”. It consisted of two sections, A and B. Section A generated demographic information of the respondents while section B had items addressing the research questions and eliciting High Extent (VHE) = 4points, High Extent (HE) = 3points, Low Extent (LE) = 2points, and Very Low Extent (VLE) = 1point responses. The instrument was validated, and the reliability established at 0.86 using Pearson r. Mean and standard deviation were used in answering the research questions while independent z-test was used in testing the hypotheses at 0.05 level of significance. Decisions taken were that values with a criterion mean of 2.50 serving as the benchmark for decision-making. The study found among others that **data literacy skills are mostly required** for decision-making and problem-solving, **AI literacy skills** for adult learners everyday digital use should be introduced into the curriculum in order for AI skills to be less difficult to understand. The study concluded that **data literacy skills are mostly required** for decision-making and problem-solving, **AI literacy skills** for adult learners everyday digital use should be introduced into the curriculum in order for AI skills to be less difficult to understand. It was recommended among others that AI literacy programme be captured in the curriculum and be made available to adult learners to enable them improve their

digital skills for sustainable community development and workforce preparedness in Obio/Akpo Local Government Area of Rivers State.

Keywords: Integrating AI Literacy, Adult Education Programmes, Sustainable, Community Development, Workforce Preparedness.

Introduction

Adult education has increasingly emerged as a fundamental pillar for promoting lifelong learning, social transformation, and human capital development across developing economies, particularly in Nigeria. It serves as a structured educational intervention designed to empower adults with functional literacy, vocational competencies, entrepreneurial skills, and civic awareness necessary for improved quality of life and active participation in societal development (National Universities Commission (NUC), 2020). Through adult education, individuals who were previously excluded from formal education systems are provided opportunities to acquire knowledge and skills that enhance employability, economic independence, and community participation in Rivers State.

In Rivers State, adult education programmes are strategically implemented to address educational disparities, reduce illiteracy rates, and promote inclusive development among diverse populations (Ignatius Ajuru University of Education, 2023). These programmes also serve as instruments for poverty reduction, social cohesion, and workforce development by equipping learners with practical skills that align with local economic needs. However, despite these efforts, many adult education systems still operate within traditional pedagogical frameworks that do not fully respond to the demands of the contemporary digital and knowledge-driven economy in recent years.

In recent years, the global educational landscape has been significantly reshaped by the rapid advancement of Artificial Intelligence (AI), machine learning, and digital technologies. These innovations have transformed how people learn, work, communicate, and solve problems in both formal and informal settings. AI literacy defined as the ability to understand, interpret, apply, and critically evaluate AI systems and their societal implications—has therefore become a crucial competency for participation in the modern digital economy (Ewa, 2024; Wami, 2023). AI literacy extends beyond technical skills; it includes ethical awareness, data interpretation, algorithmic thinking, and the ability to collaborate effectively with intelligent systems.

Empirical studies indicate that AI integration in education enhances instructional delivery, improves learner engagement, and supports personalized learning pathways that accommodate diverse adult learning needs (Rivers State University, 2025; Amaewhule, 2025). Furthermore, AI-enabled learning environments have been shown to strengthen critical thinking, digital problem-solving abilities, and workforce readiness, particularly in sectors increasingly driven by automation and data analytics (UNESCO, 2023; World Bank, 2024). Consequently, AI literacy is now considered an essential component of 21st-century education and workforce development frameworks globally.

At the global level, governments and international organizations are increasingly prioritizing AI literacy as part of broader digital transformation and sustainable development agendas. Countries are investing heavily in digital skills acquisition to prepare their citizens for emerging labour market demands and technological disruptions (The Cable, 2025). Similarly, international policy frameworks emphasize the need for inclusive digital education systems that equip learners with AI-related competencies to ensure equitable participation in the global economy (OECD, 2024; UNESCO, 2023). In line with this, Nigeria's national digital economy strategy underscores the importance of AI competence in driving innovation, entrepreneurship, productivity, and sustainable development (Federal Ministry of Communications, Innovation and Digital Economy, 2025).

For instance, AI literacy initiatives have been identified as essential for strengthening educators' instructional capacity, improving curriculum relevance, and enhancing the competitiveness of the national workforce (Ewa, 2024; AI Literacy Academy, 2025). These initiatives also support the transition from traditional rote learning systems to more dynamic, technology-driven educational models that reflect global best practices. As a result, AI literacy is increasingly viewed not only as a technical requirement but also as a catalyst for socio-economic transformation and should equally be integrated into adult learning centres especially in Obio/Akpor Local Government Area of Rivers State.

In Obio/Akpor Local Government Area of Rivers State, adult learners constitute a significant segment of the population engaged in informal, non-formal, and semi-formal education systems (Williams, 2024). These learners often include traders, artisans, civil servants, unemployed youths,

and community members seeking to improve their livelihoods through skill acquisition. However, despite the growing importance of digital competencies, many adult education programmes in the area remain largely conventional, with minimal exposure to emerging technologies such as Artificial Intelligence limited integration (Omeodu & Nweke, 2025).

This limited integration of AI tools and concepts into adult learning environments creates a widening skills gap between learners' educational experiences and the realities of the modern labour market. Consequently, many adult learners are unable to fully participate in digital-driven economic activities or contribute effectively to innovation-led community development initiatives. This situation undermines the potential of adult education as a transformative tool for sustainable development in the region.

Moreover, in the region research has shown that AI integration in education significantly enhances problem-solving abilities, data literacy, digital creativity, adaptability, and employability skills (UNESCO, 2023; World Bank, 2024). These competencies are particularly critical in addressing contemporary socio-economic challenges such as unemployment, underemployment, and low productivity. However, the effective implementation of AI-driven education systems in many Nigerian communities, including Obio/Akpor, is hindered by several constraints. These include inadequate technological infrastructure, limited access to digital tools, low levels of digital literacy among facilitators and learners, insufficient policy implementation support and shortage of trained educators (UNDP, 2023; OECD, 2024).

In addition, the shortage of trained educators capable of integrating AI into instructional practices further limits the effectiveness of adult education programmes in responding to current global trends (Federal Ministry of Education, 2024). Without deliberate intervention, these challenges may continue to restrict the ability of adult education to serve as a catalyst for sustainable community development and workforce preparedness.

Therefore, in view of the increasing relevance of Artificial Intelligence in shaping education systems, economies, and societies, the integration of AI literacy into adult education programmes is not only timely but also essential. It is expected that such integration will enhance learners' digital competencies, improve employability, and strengthen their capacity to contribute

meaningfully to sustainable community development in Obio/Akpor Local Government Area of Rivers State.

Statement of the Problem

Despite the increasing relevance of Artificial Intelligence in global education and workforce systems, adult education programmes in Obio/Akpor Local Government Area remain largely traditional and insufficiently aligned with technological advancements. This has created a gap between the skills acquired by adult learners and the competencies required in the modern digital economy. Studies indicate that AI literacy enhances innovation, productivity, and employability. However, many adult learners in Rivers State lack exposure to AI tools, limiting their ability to contribute meaningfully to community development initiatives and sustainable economic growth.

Additionally, adult education facilitators often lack adequate training in AI-based instructional methods, making it difficult to integrate AI into teaching and learning processes, this situation is compounded by infrastructural limitations, low digital awareness, and weak policy implementation frameworks. Furthermore, although national and global policies emphasize digital transformation and AI adoption, there is limited empirical evidence on how AI literacy can be effectively integrated into adult education programmes at the local government level (UNESCO, 2023; NUC, 2020). This gap raises concerns about the preparedness of adult learners for emerging workforce demands and sustainable community engagement.

Therefore, the problem of this study is the inadequate integration of AI literacy into adult education programmes in Obio/Akpor Local Government Area, which limits sustainable community development and workforce preparedness.

Purpose of the Study

The purpose of this study was to examine integrating AI literacy into adult education programmes for sustainable community development and workforce preparedness in Obio/Akpo Local Government Area of Rivers State. Specifically, the study sought to:

1. Examine the current level of AI literacy programmes among adult learners in Obio/Akpor Local Government Area of Rivers State.

2. Ascertain AI skills required for sustainable community development in Obio/Akpor Local Government Area of Rivers State.
3. To find out how AI literacy can be integrated into adult education programmes in Obio/Akpor Local Government Area of Rivers State.

Research Questions

The following Research questions guided the study

1. What is the current level of AI literacy programmes among adult learners in Obio/Akpor Local Government Area of Rivers State?
2. What are the AI skills required for sustainable community development in Obio/Akpor Local Government Area of Rivers State?
3. How can AI literacy be integrated into adult education programmes in Obio/Akpor Local Government Area of Rivers State?

Hypotheses of the Study

The following null hypotheses were tested at 0.05 level of significance:

H₀¹: There is no significant difference in the mean ratings of instructors and beneficiaries on the current level of AI literacy programmes among adult learners in Obio/Akpor Local Government Area of Rivers State.

H₀²: There is no significant difference in the mean ratings of instructors and beneficiaries on the AI skills required for sustainable community development in Obio/Akpor Local Government Area of Rivers State.

H₀³: There is no significant difference in the mean ratings of instructors and beneficiaries on how AI literacy be can integrated into adult education programmes in Obio/Akpor Local Government Area of Rivers State.

METHODOLOGY

The study adopted a descriptive survey research design. Descriptive survey research design enabled researchers document and explain what exists on the present status of the phenomenon

being investigated. The population of the study comprised of 485 respondents, 72 instructors and 413 beneficiaries in the adult training center in Obio/Akpor Local Government Area of Rivers State. From the population, a sample of 194 respondents, 28 of which were instructors and 166 of which were beneficiaries constituted the sample size, representing 40% of the entire population. The sample size was obtained through simple random sampling technique. The instrument for data collection was a questionnaire tagged “Integrating AI Literacy into Adult Education Programmes for Sustainable Community Development and Workforce Preparedness Questionnaire (IAILADPSCDWPQ)”. It consisted of two sections, A and B. Section A generated demographic information of the respondents while section B had items addressing the research questions and eliciting High Extent (VHE) = 4points, High Extent (HE) = 3points, Low Extent (LE) = 2points, and Very Low Extent (VLE) = 1point responses. The instrument was validated, and the reliability established at 0.86 using Pearson r. Mean and standard deviation were used in answering the research questions while independent z-test was used in testing the hypotheses at 0.05 level of significance. Decisions taken were that values with a criterion mean of 2.50 serving as the benchmark for decision-making.

Results

Research Question 1. What is the current level of AI literacy programmes among adult learners in Obio/Akpor Local Government Area of Rivers State?

Table 1: Mean Opinion Scores of Instructors and Beneficiaries on the Current Level of AI Literacy Programmes Among Adult Learners in Obio/Akpor Local Government Area of Rivers State.

S/No	Items	Beneficiaries	Instructors
		(N=166)	and Beneficiaries
	Instructors (N =28)		

		Mean	SD	Mean	SD	Grand Mean	SD	Remarks
1	AI literacy programmes are very limited , with mostly traditional adult education in place.	2.76	0.84	2.67	1.00	2.72	0.92	Accepted
2	Some centres offer basic digital skills , but not AI-focused training.	3.00	0.96	2.80	0.94	2.90	0.95	Accepted
3	Overall, there is a near absence of structured AI literacy programmes .	2.86	0.88	2.83	0.86	2.85	0.87	Accepted
4	AI literacy programme captured in the curriculum.	2.14	1.00	2.16	0.98	2.15	0.99	Rejected
	Aggregate Mean	2.69	0.92	2.62	0.95	2.66	0.93	Accepted

The data in table 1 revealed the mean and standard deviation of instructors and beneficiaries in the adult training center in Obio/Akpor Local Government Area of Rivers State. Based on the mean and standard deviation on the current level of AI literacy programmes among adult learners in Obio/Akpor Local Government Area of Rivers State items, 1,2, 3, and 4 with mean scores ranging between (2.14-3.00). However, the same table revealed the response of instructors as they expressed high extent on item 1, 2 and 3, instructors had mean and standard deviation between (2.76-0.84), (3.00-0.96), and (2.86-0.88) which fell under high extent. While beneficiaries on the other hand with mean and standard deviation between (2.67-1.00), (2.80-0.94), and (2.83-0.86)

equally fell on high extent. Item 4 fell on low extent with the mean and standard deviation of (2.14-1.00) and (2.16-0.98) respectively. Therefore, with an aggregate mean score of 2.69 for instructors and 2.62 for beneficiaries, it was evident that the respondents agreed that the current level of AI literacy programmes among adult learners in Obio/Akpor Local Government Area of Rivers State is to a high extent.

Research Question 2. What are the AI skills required for sustainable community development in Obio/Akpor Local Government Area of Rivers State?

Table 2: Mean Opinion Scores of Instructors and Beneficiaries on the AI Skills Required for Sustainable Community Development in Obio/Akpor Local Government Area of Rivers State.

S/N	Items	Beneficiaries	Instructors
o	Instructors (N =28)	s (N=166)	and Beneficiaries

		Mean	SD	Mean	SD	Grand Mean	Remarks
1	Basic AI literacy skills are mostly for everyday digital	2.29	0.94	2.17	1.02	2.23	0.98 Rejected
2	Data literacy skills are not for decision-making and problem-solving.	2.57	0.86	2.74	0.96	2.66	0.91 Accepted
3	Advanced digital skills like AI tools usage and ethical awareness	2.64	0.98	2.81	0.88	2.72	0.93 Accepted
4	AI skills are difficult to understand	2.79	0.88	3.03	0.84	2.91	0.86 Accepted
	Aggregate Mean	2.57	0.92	2.69	0.93	2.63	0.92 Accepted

The data in table 2 revealed the mean and standard deviation of instructors and beneficiaries in the adult training center in Obio/Akpor Local Government Area of Rivers State. Based on the mean and standard deviation on the AI skills required for sustainable community development in Obio/Akpor Local Government Area of Rivers State items, 1,2, 3, and 4 with mean scores ranging between (2.17-3.03). However, the same table revealed the response of instructors as they

expressed high extent on item 2, 3 and 4, instructors had mean and standard deviation between (2.57-0.86), (2.64-0.98), and (2.79-0.88) which fell under high extent. While beneficiaries on the other hand with mean and standard deviation between (2.74-0.96), (2.81-0.88), and (3.03-0.84) equally fell on high extent. Item 1 fell on low extent with the mean and standard deviation of (2.29-0.94) and (2.17-1.02) respectively. Therefore, with an aggregate mean score of 2.57 for instructors and 2.69 for beneficiaries, it was evident that the respondents agreed that the AI skills required for sustainable community development in Obio/Akpor Local Government Area of Rivers State is to a high extent.

Research Question 3. How can AI literacy be integrated into adult education programmes in Obio/Akpor Local Government Area of Rivers State?

Table 3: Mean Opinion Scores of Instructors and Beneficiaries on how AI Skills literacy can be integrated into adult education programmes in Obio/Akpor Local Government Area of Rivers State.

S/No	Items	Instructors (N =28)	Beneficiaries (N=166)	Instructors and Beneficiaries
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		Mean	SD	Mean	SD	Grand Mean	Remarks
1	By including AI topics in adult education curricula.	2.79	0.88	2.83	0.86	2.81	0.87 Accepted
2	Through training of facilitators on AI tools and methods.	2.64	0.94	2.87	0.94	2.76	0.94 Accepted
3	By creating digital learning centres and ICT partnerships.	2.86	0.96	2.95	0.96	2.91	0.96 Accepted
4	Making AI topics simple and easy for adult learners understanding	2.93	0.98	3.01	0.88	2.87	0.93 Accepted
	Aggregate Mean	2.81	0.94	2.92	0.91	2.87	0.93 Accepted

The data in table 3 showed the mean and standard deviation of instructors and beneficiaries in the adult training center in Obio/Akpor Local Government Area of Rivers State. Based on the mean and standard deviation on how AI literacy can be integrated into adult education programmes in Obio/Akpor Local Government Area of Rivers State items, 1,2, 3, and 4 with mean scores ranging between (2.64-3.01). However, the same table revealed the response of instructors as they expressed high extent on item 1,2, 3 and 4, instructors had mean and standard deviation between (2.79-0.88), (2.64-0.94), (2.86-0.96) and (2.93-0.98) which fell under high extent. While beneficiaries on the other hand with mean and standard deviation between (2.83-0.86), (2.87-0.94), (2.95-0.96) and (3.01-0.88) equally fell on high extent. Therefore, with an aggregate mean score of 2.81 for instructors and 2.92 for beneficiaries, it was evident that the respondents agreed that AI literacy can be integrated into adult education programmes in Obio/Akpor Local Government Area of Rivers State to a high extent.

Hypotheses 1: There is no significant difference in the mean ratings of instructors and beneficiaries on the current level of AI literacy programmes among adult learners in Obio/Akpor Local Government Area of Rivers State.

Table 4: Z-test Analysis of the Significant Difference between of Instructors and Beneficiaries on the current level of AI literacy programmes among adult learners in Obio/Akpor Local Government Area of Rivers State.

Respondents	N	X	SD	df	z -Cal	z -Crit	Ls	Decision
Instructors	28	2.69	0.92	192	1.7489	1.96	0.05	Accepted
Beneficiaries	116	2.62	0.95					

Table 4 shows that instructors had a mean and standard deviation score of 2.69 and 0.92 respectively, while adult learners had mean and standard deviation scores of 2.62 and 0.95 respectively. The z-cal value was 1.7489, while z-crit was 1.96 with a degree of freedom of 192 at 0.05 level of significance. This result shows that z-cal was less than z-crit which implies that the null hypothesis was Accepted. Thus, there is no significant difference between the mean response of instructors and beneficiaries on the current level of AI literacy programmes among adult learners in Obio/Akpor Local Government Area of Rivers State.

Hypotheses 2: There is no significant difference in the mean ratings of instructors and beneficiaries on the AI skills required for sustainable community development in Obio/Akpor Local Government Area of Rivers State.

Table 5: Z-test Analysis of the Significant Difference between of Instructors and Beneficiaries on the current level of AI skills required for sustainable community development in Obio/Akpor Local Government Area of Rivers State.

Respondents	N	X	SD	df	z -Cal	z -Crit	Ls	Decision
Instructors	28	2.57	0.92	192	1.7113	1.96	0.05	Accepted
Beneficiaries	116	2.62	0.95					

Beneficiaries 166 2.69 0.93

Table 5 shows that instructors had a mean and standard deviation score of 2.57 and 0.92 respectively, while adult learners had mean and standard deviation scores of 2.69 and 0.93 respectively. The z-cal value was 1.7113, while z-crit was 1.96 with a degree of freedom of 192 at 0.05 level of significance. This result shows that z-cal was less than z-crit which implies that the null hypothesis was Accepted. Thus, there is no significant difference between the mean response of instructors and beneficiaries on the AI skills required for sustainable community development in Obio/Akpor Local Government Area of Rivers State.

Hypotheses 3: There is no significant difference in the mean ratings of instructors and beneficiaries on how AI literacy can be integrated into adult education programmes in Obio/Akpor Local Government Area of Rivers State.

Table 6: Z-test Analysis of the Significant Difference between of Instructors and Beneficiaries on the current level of AI skills required for sustainable community development in Obio/Akpor Local Government Area of Rivers State.

Respondents	N	X	SD	df	z -Cal	z -Crit	Ls	Decision
Instructors	28	2.81	0.94	192	1.7117	1.96	0.05	Accepted
Beneficiaries	166	2.92	0.91					

Table 6 shows that instructors had a mean and standard deviation score of 2.81 and 0.94 respectively, while adult learners had mean and standard deviation scores of 2.92 and 0.91 respectively. The z-cal value was 1.7117, while z-crit was 1.96 with a degree of freedom of 192 at 0.05 level of significance. This result shows that z-cal was less than z-crit which implies that the null hypothesis was Accepted. Thus, there is no significant difference between the mean response of instructors and beneficiaries on how AI literacy can be integrated into adult education programmes in Obio/Akpor Local Government Area of Rivers State.

Discussion of Findings

current level of AI literacy programmes among adult learners in Obio/Akpor Local Government Area of Rivers State

The result of the study on research question 1 revealed that AI literacy programmes among adult learners are **very limited, near absence of structured AI literacy programmes**. It also revealed that some centres offer **basic digital skills**, but not AI-focused training with mostly traditional adult education in place making AI literacy programme not captured in the curriculum. The findings agrees with Omeodu & Nweke (2025) as they viewed that despite the growing importance of digital competencies, many adult education programmes in the area remain largely conventional, with minimal exposure to emerging technologies such as Artificial Intelligence.

AI skills required for sustainable community development in Obio/Akpor Local Government Area of Rivers State

Table 2 of this study revealed that **data literacy skills are mostly required** for decision-making and problem-solving, **AI literacy skills** for adult learners everyday digital use should be introduced into the curriculum in order for AI skills to be less difficult to understand. The findings is in line with Ewa, (2024) and Wami (2023) who asserted that AI literacy is the ability to understand, interpret, apply, and critically evaluate AI systems and their societal implications has therefore become a crucial competency for participation in the modern digital economy as AI literacy extends beyond technical skills; it includes ethical awareness, data interpretation, algorithmic thinking, and the ability to collaborate effectively with intelligent systems.

How AI literacy can be integrated into adult education programmes in Obio/Akpor Local Government Area of Rivers State.

Table 3 of this study revealed that AI literacy be integrated into adult education programmes by making AI topics simple and easy for adult learners understanding, creating **digital learning centres and ICT partnerships, including AI topics in adult education curricula and training of facilitators on AI tools and methods**. These results are in line with UNESCO (2023) and World Bank (2024) who viewed that AI integration in education significantly enhances problem-solving abilities, data literacy, digital creativity, adaptability, and employability skills as these

competencies are particularly critical in addressing contemporary socio-economic challenges such as unemployment, underemployment, and low productivity.

Conclusion

Based on the results and the findings of this research, the researchers noted that AI literacy programmes among adult learners are **very limited**, some centres offer **basic digital skills**, but not AI-focused training with mostly traditional adult education in place making AI literacy programme not captured in the curriculum. **Data literacy skills are mostly required** for decision-making and problem-solving, **AI literacy skills** for adult learners everyday digital use should be introduced into the curriculum in order for AI skills to be less difficult to understand. Therefore, it is imperative to note that integrating AI literacy into adult education programmes for sustainable community development and workforce preparedness in Obio/Akpo Local Government Area of Rivers State as it will make AI topics simple and easy for adult learners understanding, creating **digital learning centres and ICT partnerships**.

Recommendations

Based on the findings and conclusions generated from the study, the following recommendations were made by the researchers:

1. AI literacy programme be captured in the curriculum and be made available to adult learners to enable them improve their **digital skills** for sustainable community development and workforce preparedness in Obio/Akpo Local Government Area of Rivers State.
2. **Data literacy skills be integrated** into adult education programmes for decision-making and problem-solving for sustainable community development and workforce preparedness in Obio/Akpo Local Government Area of Rivers State.
3. **Training of facilitators on AI tools and methods will in turn** make AI topics simple and easy for adult learners understanding for sustainable community development and workforce preparedness in Obio/Akpo Local Government Area of Rivers State.

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